Application Number 10/521531
Response to the Office Action dated July 28, 2008

REMARKS

Favorable reconsideration of this application is requested in view of the following remarks.

Claim 6 has been canceled without prejudice.

Claim 1 has been amended to include limitations of the aromatic ring as supported by the specification at page 3, lines 23-28, page 3, line 31 – page 4, line 4, page 18, lines 8-16, page 26, lines 22-27, page 28, lines 16-23 and table 1 at page 29 with editorial revisions.

Claims 7 and 8 have been added as supported by the specification at page 4, lines 5-18, and claim 9 has been added as supported by the specification at page 14, lines 13-28. Claim 10 has been added as supported by table 1 of the specification at page 29.

Applicants include a copy of the preliminary amendment submitted on January 14, 2005 upon entering the U.S. national stage for the Examiner's convenience.

Claims 1-5 have been rejected under 35 U.S.C. 112, first paragraph, as not complying with the enablement requirement. Applicants respectfully traverse this rejection.

Claim 1 has been amended to limit the compound, i.e., the substrate, to aromatic rings whose ring atoms are carbon atoms and which may have at least one substituent, a condition to the neutral condition, and a source to activate the catalysts to hydrogen gas or heavy hydrogen gas. By using the information in the specification, those skilled in the art are able to conduct the deuteration of claim 1 without undue experimentation. Accordingly, the specification sufficiently discloses the method of claim 1, and this rejection should be withdrawn.

Claims 1-5 have been rejected under 35 U.S.C. 102(b) as being anticipated by Junk et al. (Tetrahedron Letters, Vol. 37, No. 20, pp. 3445-3448, 1996). Applicants respectfully traverse this rejection.

Junk discloses a method to prepare deuterated aromatic substrates by using deuterium oxide (D_2O) and sodium deuteroxide (NaOD) (see last para. at page 3445). This reaction requires NaOD, i.e., a basic condition. In contrast, claim 1 requires the neutral condition.

In addition, Junk suggests use of a combination of D_2O and Pd or that of C_6D_6 and $EgAlCl_2$ for the deuteration reaction (see Scheme 1 at page 3446). However, Junk fails to disclose that the Pd catalyst is activated with hydrogen gas or heavy hydrogen gas as claim 1 requires.

Further, the reaction of Junk requires high temperature such as 380 °C or higher (see table 1, a-c at page 3447). In contrast, in the method of deuteration of the present application, the deuteration reaction can be carried out at relatively low temperature such as at 180 °C or lower as supported by claim 10, and accordingly, the reaction can be applied for deuteration of compounds that can be decomposed at high temperature such as at 380 °C or in acidic or basic conditions that are contemplated by Junk.

Accordingly, Claim 1 is distinguished from the method of Junk, and this rejection should be withdrawn.

Claims 1-5 have been rejected under 35 U.S.C. 102(b) as being anticipated by Tsuzuki et al. (Journal of Deuterium Science (1993), 3(1), 28-32). Applicants respectfully traverse this rejection.

Tsuzuki discloses a reduction reaction of halogenated derivatives with a Raney alloy such as Ni-Al alloy in NaOD-D_2O. Thus, like in Junk, the reaction of Tsuzuki is carried out under a basic condition (see abstract), and Tsuzuki fails to disclose the reaction that is conducted under the neutral condition and use of the catalyst that is activated with hydrogen gas or heavy hydrogen gas as claim 1 requires. Accordingly, claim 1 is distinguished from Tsuzuki, and this rejection should be withdrawn.

Claims 1-5 have been rejected under 35 U.S.C. 102(b) as being anticipated by Kakinami et al. (Japanese Patent Application Publication No. 06-228014). Applicants respectfully traverse this rejection.

Kakinami discloses a reaction of halogenated aromatic compounds with a Raney alloy such as Cu-Al alloy and Ni-Al alloy in D_2O with alkali metal carbonate such as Na_2CO_3-D_2O and/or alkaline earth metal carbonate (see abstract and para. [0025]). Like in Junk and Tsuzuki, the reaction solution of Kakinami includes alkali metal carbonate and/or alkaline earth metal carbonate, i.e., the reaction condition is basic. In contrast, claim 1 requires the neutral condition.

In addition, Kakinami fails to disclose use of the catalyst activated with hydrogen gas or heavy hydrogen gas as claim 1 requires.

Accordingly, claim 1 is distinguished from Kakinami, and this rejection should be withdrawn.

Claims 1-5 have been rejected under 35 U.S.C. 102(b) as being anticipated by Sokol'skii et al. (Izvestiya Akademii Nauk Kazakhskoi SSR, Seriya Khimicheskaya (1987), (5), 32-35). Applicants respectfully traverse this rejection.

Sokol'skii fails to disclose that the reaction is carried out under a neutral condition and that the catalysts are activated by hydrogen gas or heavy hydrogen gas as claim 1 requires (see abstract). Accordingly, claim 1 is distinguished from Sokol'skii, and this rejection should be withdrawn.

Claims 1-5 have been rejected under 35 U.S.C. 102(b) as being anticipated by Dinh-Nguyen, et al. (U.K. Patent No. 1,103,607). Applicants respectfully traverse this rejection.

Dinh-Nguyen discloses a process of replacement of light hydrogen by deuterium in hydrogen-containing organic compounds with deuterium oxide in presence of alkaline metal deuteroxide or alkaline earth metal deuteroxide (see coln. 1, lines 30-45 and coln. 2, lines 67-74). Thus, like in Junk, Tsuzuki, and Kakinami, the reaction condition of

Dinh-Nguyen is basic. In contrast, claim 1 requires the neutral condition. Accordingly, claim 1 is distinguished from Dinh-Nguyen, and this rejection should be withdrawn.

Claim 6 has been rejected under 35 U.S.C. 102(b) as being anticipated by Usov et al. (Journal of Physical Chemistry A (1999), 103(11), 1690); claim 6 has been rejected under 35 U.S.C. 102(b) as being anticipated by Uno et al. (Spectrochimica Acta, Part A: Molecular and Biomolecular Spectroscopy (1968), 24(11), 1705-12); and claim 6 has been rejected under 35 U.S.C. 102(b) as being anticipated by Wszolek, et al. (Organic Mass Spectrometry (1968), 1(1), 127-37). Applicants respectfully traverse the rejections.

Claim 6 has been canceled. Accordingly, the rejections are moot and should be withdrawn.

Claims 1-5 have been provisionally rejected for the non-statutory obviousness-type double patenting as being unpatentable over claims 1-6 of copending application no. 10/534,344 (Ito et al.) and claims 1-3, 5-10, and 13 of copending application no. 10/539,188 (Ito et al.). Applicants respectfully traverse the rejection.

Claims 1-6 of the '344 application are directed to a deuteration method of a heterocyclic ring. The heterocyclic ring includes at least one heteroatom such as nitrogen, oxygen, and sulfur (see para. [0011]). In contrast, claim 1 of the present application requires the aromatic ring whose ring consists of carbon atoms. Accordingly, claim 1 of the present application is distinguished from the '344 application.

Applicants file herewith a terminal disclaimer over the '188 application. Therefore, the part of the rejection over the '188 application is moot.

Accordingly, this rejection should be withdrawn.

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In view of the above, Applicants request reconsideration of the application in the form of a Notice of Allowance.

Respectfully submitted,

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Dated: December 29, 2008

By: _____
Douglas P. Mueller
Reg. No. 30,300

DPM/my/ad

S/N Unknown

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	ITO et al.	Examiner:	Unknown
Serial No.:	Unknown	Group Art Unit:	Unknown
Filed:	January 14, 2005	Docket No.:	14633.0006USWO
Title:	A METHOD FOR DEUTERATION OF AN AROMATIC RING		

CERTIFICATE UNDER 37 CFR 1.10:
"Express Mail" mailing label number: EV 495867987 US
Date of Deposit: January 14, 2005

I hereby certify that this paper or fee is being deposited with the U.S. Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to Mail Stop PCT, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

By: _____
Name: David Ortiz

PRELIMINARY AMENDMENT

Mail Stop PCT
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

In connection with the above-identified application filed herewith, please enter the following preliminary amendment:

Amendments to the claims are reflected in the listing of claims which begins on page 2 of this paper.

Remarks begin on page 4 of this paper.

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Amendments to the claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (ORIGINAL) A method for deuteration of a compound having an aromatic ring, which comprises reacting the compound having the aromatic ring with heavy hydrogen source in the presence of an activated catalyst selected from a platinum catalyst, a rhodium catalyst, a ruthenium catalyst, a nickel catalyst and a cobalt catalyst.

2. (ORIGINAL) The method for deuteration according to claim 1, wherein the catalyst is an activated platinum catalyst.

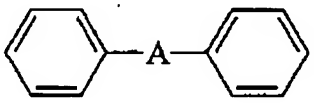
3. (ORIGINAL) The method for deuteration according to claim 2, wherein the platinum catalyst is one comprising platinum of 0 to 2 valences.

4. (ORIGINAL) The method for deuteration according to claim 2, wherein the platinum catalyst is platinum carbon.

5. (CURRENTLY AMENDED) The method for deuteration according to claim 1, wherein the aromatic ring is one selected from a group consisting of benzene, naphthalene, anthracene, phenanthrene, 9,10-dihydroanthracene, naphthacene, pentaphene, pentacene, hexaphene, hexacene, heptaphene, heptacene, trinaphthylene, 1,4-dihydronaphthalene, pyrene, triphenylene, biphenylene, indene, indan, indacene, phenalene, fluorene, acenaphthene, acenaphthylene, fluoranthene, tetraphenylene, coranthrene, acephenanthrylene, aceanthrylene,

cyclopentaphenanthrene, chrysene, picene, pleiadene, rubicene, pyranthrene, coronene, perylene, rubrene, dibenzophenanthrene, 1,2-dibenzo-1,3-cycloheptadiene~~, pyranthrene~~ and ovalene.

6. (ORIGINAL) A compound represented by the general formula [2]:



[2]

(wherein A is a sulfur atom, a sulfinyl group or a sulfonyl group and at least one of hydrogen atoms belonging to an aromatic ring is a heavy hydrogen atom).

Remarks

The above preliminary amendment is made to amend claim 5.

A courtesy copy of the present specification is enclosed herewith. However, the World Intellectual Property Office (WIPO) copy should be relied upon if it is already in the U.S. Patent Office.

Applicants respectfully request that the preliminary amendment described herein be entered into the record prior to calculation of the filing fee and prior to examination and consideration of the above-identified application.

If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Applicants' primary attorney-of record, Douglas P. Mueller (Reg. No. 30,300), at (612) 371-5237.

Respectfully submitted,

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Dated: January 14, 2005

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